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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/784,750	02/23/2004	Frank Dimeo JR.	2771-546 CIP 2	2238
23448 7590 09/19/2008 INTELLECTUAL PROPERTY / TECHNOLOGY LAW PO BOX 14329 RESEARCH TRIANGLE PARK, NC 27709				
EXAMINER				
SAINT SURIN, JACQUES M				
ART UNIT		PAPER NUMBER		
2856				
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09/19/2008		PAPER		

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

### Office Action Summary

**Application No.**

10/784,750

**Applicant(s)**

DIME ET AL.

**Examiner**

J M. SAINT SURIN

**Art Unit**

2856

**Period for Reply** -- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 15 August 2008.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-43, 46 and 47 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 1-32, 35-36, 38 and 46-47 is/are allowed.
- 6) ☒ Claim(s) 33-34, 37, 39 and 41-43 is/are rejected.
- 7) ☒ Claim(s) 40 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO/SB/08)
- Paper No(s)/Mail Date \_\_\_\_\_
- 4) ☐ Interview Summary (PTO-413)
- Paper No(s)/Mail Date \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: \_\_\_\_\_

**DETAILED ACTION**

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 08/15/08 has been entered.

***Response to Arguments***

2. Applicant's arguments with respect to claims 1-43 and 46-47 have been considered but are moot in view of the new ground(s) of rejection.
3. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.
4. The indicated allowability of claims 35-38 is withdrawn in view of the newly discovered reference(s) to Ricco et al. (US Patent 5,834,627) in view of Morin (US Patent 4,680,093). Rejections based on the newly cited reference(s) follow.

***Claim Rejections - 35 USC § 102***

6. Claim 43 is rejected under 35 U.S.C. 102(e) as being anticipated by Liu et al. (US Patent 6,923,054 B2).

Regarding claim 43, Liu discloses a gas sensor assembly (10, col. 4, lines 39-42) comprising a support structure (col. 3, lines 46-54 and col. 5, lines 1-16) for suspending a free-standing nickel containing gas-sensing filament wherein the support structure

comprises a fluoro-resistant material selected from the group consisting of polyimide, aluminum and nickel (see: col. 3, lines 55-59).

***Claim Rejections - 35 USC § 103***

5. Claims 33-34 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ricco et al. (US Patent 5,834,627) in view of Morin (US Patent 4,680,093).

The filaments are made using Si microfabrication techniques and are suspended above a substrate. As such the filaments have extremely low thermal mass which enables very fast response times. The filaments may be made with poly-crystalline Si cores that are surrounded by a protective layer such as Si.sub.3 N.sub.4-x. This protective layer serves to protect the poly-Si and to place a non-conductive surface between the conductive poly-Si and the potentially conductive catalyst.

Regarding claims 33-34 and 37, Ricco et al. discloses a gas sensor assembly comprising a gas-sensing filament (gas sensor that employs at least one pair of filaments, see: col. 1, lines 64-67) comprising a coating structure (gas sensor that uses a resistively heated, metal-coated, see abstract) and a core structure (poly-crystalline Si cores, col. 2, line 10), wherein said coating structure comprises nickel or nickel alloy (the catalyst is deposited on (and only on) one or more electrically selected filaments (a wide variety of metals (e.g., Pt, Pd, Rh, Ir, Ru, Re, Ni, Au) [Ni e.g., nickel), as well as mixtures of the metals and/or the ceramics, can be deposited using this technique, and the formation of alloys and/or layered films using a mixture of precursors and/or sequential deposition from different precursors is feasible as well, see: col. 4, lines 22-28); and wherein said core structure comprises silicon (the filaments may be made with

poly-crystalline Si cores that are surrounded by a protective layer such as Si.sub.3 N.sub.4-x., see: col. 2, lines 9-11). Regarding claim 34, Morin discloses filaments 2 which may comprise carbon, silicon carbide (col. 3, lines 27-28). However, Ricco et al. does not particularly disclose or suggest a core comprising a silicon carbide. Morin discloses the core is semimetallic, e.g., carbon, graphite, boron or **silicon carbide** (col. 8, lines 18-19). It would have been obvious to one having ordinary skill in the art at the time of the invention to utilize in Ricco et al. the core of Morin because it would provide a metal coated filaments wherein the core-to-metal bond strength being sufficient to provide that, when the coated filament is bent sharply the coating may fracture, but it will not peel off thereby, realizing a reliable and secure filament to make the above combination very effective.

6. Claim 37 is rejected under 35 U.S.C. 103(a) as being unpatentable over Ricco et al. (US Patent 5,834,627) in view of Stanley et al. (US Patent 3,550,247).

Regarding claim 37, Ricco discloses a gas sensor that employs at least one pair of filaments (see: col. 1, lines 64-67). Ricco further discloses the catalyst is deposited on (and only on) one or more electrically selected filaments (a wide variety of metals (e.g., Pt, Pd, Rh, Ir, Ru, Re, Ni, Au. However, Ricco et al. does not particularly disclose or suggest electrochemically thinning said gas-sensing filament for a sufficient period of time, so as to reduce the average diameter thereof. Stanley et al. discloses the reduction may be carried out, for example, by immersing the dipped carbon filaments in the electroless nickel plating solution which ion contains a reducing agent, for example sodium hypophosphite, alternatively, the filaments can be treated with, for example,

stannous chloride solution, and subsequently with palladium chloride solution, under which circumstances the palladium salt is reduced to the metal 15 on the filaments (by first forming a thin coating of palladium on the filaments by dipping them in a solution containing palladium ions, for example palladium chloride, and then reducing those ions to the metal, the reduction may be carried out, for example, by immersing the dipped carbon filaments in the electroless nickel plating solution which ion contains a reducing agent, for example sodium hypophosphite (col. 4, lines 3-11). It would have been obvious to one having ordinary skill in the art at the time of the invention to utilize in Ricco the techniques of Stanley because the coating metal should be capable of withstanding the conditions employed in embedding the coated filaments in a metal matrix and the conditions which the reinforced metal article will meet in use for example, the coating metal should have a melting point sufficiently high that it does not melt either when the reinforced article becomes hot in use or when the coated filaments are embedded in molten metal. Thus, the amount of reinforcement will be dependent upon the mean thickness of the metal coating and the mean diameter of the filaments and thus a 50 percent reinforcement by volume could be obtained by using metal coated filaments in which the ratio of the diameters of the carbon or graphite filaments and the metal coated carbon or graphite filaments wherein the reduction reaction process would be realized in an efficient manner.

7. Claim 39 is rejected under 35 U.S.C. 103(a) as being unpatentable over Ricco et al. (US Patent 5,834,627) in view of Berchthold et al. (US Patent 4,28,494).

Regarding claim 39, Ricco discloses a gas sensor assembly comprising a gas-sensing filament (see: col. 1, lines 64-67) and a catalyst is deposited on one or more electrically selected filaments (a wide variety of metals (e.g., Pt, Pd, Rh, Ir, Ru, Re, Ni, Au. However, Ricco does not particularly disclose a nickel-copper-aluminum alloy. Berchtold discloses a nickel-copper-aluminum alloy (see col. 2, lines 9-10). It would have been obvious to one having ordinary skill in the art at the time of the invention to utilize in Ricco the nickel-copper-aluminum alloy of Berchtold because the nickel-copper-aluminum alloys have a very good resistance to corrosion and a very good processability. Nickel, chromium, aluminium, copper and lead are examples of metals which can benefit from reinforcement with carbon filaments in certain uses. Thus, the strength of components made of nickel or chromium or their alloys which are subject to high temperatures, for example turbine blades, may be improved by the incorporation of carbon filaments to make the above combination more effective.

8. Claims 41-42 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ricco et al. (US Patent 5,834,627) in view of Messing et al. (US Patent 4,367,127).

Regarding claim 41-42, Ricco discloses a gas sensor assembly comprising a gas-sensing filament (see: col. 1, lines 64-67). However, it does not disclose a nickel-containing gas-sensing filament having a porous surface. Messing discloses gas a Messing discloses filaments comprising the tows are coated with a thin layer of electroplated or otherwise deposited **nickel** which adds greatly desired properties to the very **porous** and high **surface** area electrode (see col. 3, lines 30-34). It would have been obvious to one having ordinary skill in the art to utilize in Ricco the

techniques of Messing and realize the filament with nickel with the porous surface in an efficient manner.

***Allowable Subject Matter***

9. Claims 1-32, 35-36, 38 and 46-47 are allowable over the prior art of record.
10. Claim 39 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to J M. SAINT SURIN whose telephone number is (571)272-2206. The examiner can normally be reached on Mondays to Fridays between 9:30 A.M and 6:00 P.M..

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Hezron L. Williams can be reached on (571) 272-2208. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.



Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Jacques M SAINT SURIN/  
Examiner, Art Unit 2856